another dielectric layer comprising silicon nitride provided over the another dielectric layer comprising tin oxide.

REMARKS

This is in response to the Office Action dated August 5, 2002. Claims 1-40 are pending. Attached hereto is a marked-up version of the changes made to the claim(s) by the current amendment. The attached page(s) is captioned "**Version With Markings To Show Changes Made.**"

Claim 1 stands rejected under 35 U.S.C. Section 103(a) as being allegedly unpatentable over Krisko (US 6,060,178) in view of Macquart (US 5,935,702). This Section 103(a) rejection is respectfully traversed for at least the following reasons.

Claim 1 requires:

"a) a titanium oxide inclusive layer;

b) a zinc oxide inclusive contact layer;

c) a silver inclusive layer contacting the zinc oxide inclusive layer b);

d) a nickel chrome oxide inclusive layer contacting the silver inclusive layer c);

e) a tin oxide inclusive layer . . . ;

wherein the coated article is not tempered or heat bent."

Thus, claim 1 clearly requires a layer comprising silver sandwiched between and contacting each of a layer comprising zinc oxide and a layer comprising nickel chrome oxide. Example advantages associated with this unique combination are discussed in

paragraph [22] of the instant specification on pgs. 7-8. The cited art fails to disclose or suggest the aforesaid quoted aspects of claim 1, either alone or in the alleged Section 103(a) combination.

Krisko, the base reference, discloses in Figure 3 of its disclosure a layer stack of: glass/SiN/ZnO/Ag/Nb/ZnO/SiN/ZnO/Ag/Nb/ZnO/SiN. Both Ag layers in Krisko are sandwiched between a ZnO layer and a Nb layer. Moreover, Krisko *emphasizes* that the layer (i.e., the Nb layer) overlying each Ag layer ***must be metallic*** (i.e., *not oxidized*) in order to prevent nitrogen and oxygen from coming into reactive contact with the Ag during tempering (e.g., col. 4, lines 59-66). Thus, it can be seen that Krisko teaches directly away from the invention of claim 1 by requiring a purely metallic layer deposited directly over the Ag layer. In this regard, Krisko clearly states that this layer is not to be deposited as an oxide or nitride, but instead that it must be metallic.

Recognizing that Krisko fails to disclose or suggest a layer comprising nickel chrome oxide over the Ag layer, the Office Action cites to Macquart. The Office Action contends that Macquart sputters a NiCr layer in an oxygen atmosphere over the Ag layer. The Office Action has *misinterpreted* Macquart in this respect. Macquart clearly states that the protective layer 5 located over the Ag layer is metallic (i.e., not an oxide) (e.g., see col. 2, lines 48-50; col. 4, lines 1-7 and 15-17; col. 6, lines 8-14). This metallic layer (e.g., Nb) is deposited in an inert gas atmosphere to prevent it from oxidizing (col. 9, lines 59-62). Moreover, Macquart teaches that the Ag layers are to be prevented from oxidizing upon heat treatment (e.g., due to the metallic Nb layer) (col. 8, lines 25-30). Given the fact that Macquart repeatedly states that protective layer 5 is "metallic" and

that Ag layer 4 is to be protected from oxidation during heat treatment, it is clear that layer 5 is in fact "metallic" as the references teaches and that it is not deposited in an oxidizing atmosphere as alleged by the Office Action. Macquart, at col. 6, lines 18-25, is merely explaining that the protecting metallic layer 5 is "necessary" to protect the Ag layer from an oxide layer 6 (e.g., ZnO) which may be sputtered over layers 4 and 5. Macquart, at col. 6, lines 21-29, explains that the protective metallic layer 5 is not quite as necessary if the layer 6 is a nitride as opposed to an oxide. Accordingly, it is clear that Macquart does not disclose or suggest sputtering a NiCrOx layer directly over an Ag layer as alleged in the Office Action. Instead, Macquart teaches directly away from this by repeatedly stating that protective layer 5 must be "metallic" in order to protect the Ag.

Neither Krisko nor Macquart disclose or suggest a layer comprising silver sandwiched between and contacting each of a layer comprising zinc oxide and a layer comprising nickel chrome oxide. In fact, both teach directly away from this by requiring that the layer over the Ag be "metallic." Thus, even if Krisko and Macquart were combined as alleged in the Office Action (which applicant believes would be incorrect in any event), the invention of claim 1 still would not be met.

Furthermore, as explained above, Krisko *emphasizes* that the layer (i.e., the Nb layer) overlying each Ag layer ***must be metallic*** (i.e., *not oxidized*) in order to prevent nitrogen and oxygen from coming into reactive contact with the Ag during tempering (e.g., col. 4, lines 59-66). Given Krisko's teaching that the layer directly overlying the Ag must be metallic in order to prevent nitrogen and oxygen from reaching the Ag during tempering, one of ordinary skill in the art would never have modified Krisko as alleged in

the Office Action to make this layer an oxide. *Such a modification would fly directly in the face of the teachings of Krisko, and thus would never have been made. Moreover, the alleged modification to Krisko would destroy the functionality of Krisko since this would allow the Ag to significantly oxidize upon heat treatment thereby functionally destroying the coated article.* One of ordinary skill in the art would never have modified Krisko in order to destroy its functionality, especially when such a modification is in direct contrast with its teachings. The Section 103(a) rejection is fundamentally flawed.

Finally, claim 1 requires that the coated article is *not* tempered or heat bent. Thus, it *cannot* be argued that the metallic Nb layers of Krisko and Macquart become partially oxidized during heat treatment and thus meet claim 1 for this reason. The Nb layers 46, 48 of Krisko, and Nb layer 5 of Macquart, are clearly metallic as deposited before heat treatment, and thus cannot possibly meet the invention of claim 1.

Claim 1 further stands rejected under 35 U.S.C. Section 103(a) as being allegedly unpatentable over Krisko in view of Hartig '455. This Section 103(a) rejection is respectfully traversed for at least the following reasons.

Claim 1 clearly requires a layer comprising silver sandwiched between and contacting each of a layer comprising zinc oxide and a layer comprising nickel chrome oxide. Example advantages associated with this unique combination are discussed in paragraph [22] of the instant specification on pgs. 7-8. For example, the instant specification states in paragraph [22] that:

> "Surprisingly, it has been found that by using ZnO_x, $ZnAlO_x$, or the like for the lower contact layer(s) 7 and/or 17, while using $NiCrO_x$ for the upper contact layer(s) 11 and/or 21, the resulting coated article can achieve a combination of

> high visible transmission and reduced sheet resistance R_s, as well as acceptable durability (mechanical and/or chemical). The highly durable $NiCrO_x$ is used for the upper contact layers 11 and/or 21 for durability purposes, while the solar controlling ZnO_x, $ZnAlO_x$, or the like is used for the lower contact layer(s) 7 and/or 17 to improve visible transmission and/or other solar characteristics. In other words, the $NiCrO_x$ provides good durability, especially when on top of the Ag layers, and the zinc oxide inclusive contact layer(s) enable high visible transmission to be combined with low sheet resistance R_s and/or good solar performance."

Neither Krisko nor Hartig disclose or suggest an Ag inclusive layer sandwiched between and contacting a layer comprising zinc oxide and a layer comprising nickel chrome oxide. The surprising advantages associated with the claimed invention are also not present in the cited art. Thus, even if Krisko and Hartig were combined as alleged in the Office Action, there would still be no teaching of an Ag inclusive layer sandwiched between and contacting a layer comprising zinc oxide and a layer comprising nickel chrome oxide as required by claim 1.

Furthermore, as explained above, Krisko *emphasizes* that the layer (i.e., the Nb layer) overlying each Ag layer ***must be metallic*** (i.e., *not oxidized*) in order to prevent nitrogen and oxygen from coming into reactive contact with the Ag during tempering (e.g., col. 4, lines 59-66). Given Krisko's teaching that the layer directly overlying the Ag must be metallic in order to prevent nitrogen and oxygen from reaching the Ag during tempering, one of ordinary skill in the art would never have modified Krisko as alleged in the Office Action to make this layer an oxide. *Such a modification would fly directly in the face of the teachings of Krisko, and thus would never have been made. Moreover, the alleged modification to Krisko would destroy the functionality of Krisko since this would allow the Ag to significantly oxidize upon heat treatment thereby functionally*

destroying the coated article. One of ordinary skill in the art would never have modified Krisko in order to destroy its functionality, especially when such a modification is in direct contrast with its teachings. The Section 103(a) rejection based upon Krisko and Hartig is fundamentally flawed.

Claim 7 requires "a lower contact layer comprising zinc oxide; an infrared (IR) reflecting layer comprising silver contacting the lower contact layer comprising zinc oxide; an upper contact layer comprising at least one of an oxide of nickel, an oxide of chromium, and nickel chrome oxide which contacts the IR reflecting layer comprising silver; wherein the IR reflecting layer comprising silver is located between and in contact with the lower and upper contact layers; and wherein the coated article is not heat treated." The cited art fails to disclose or suggest this aspect of claim 7.

Claim 17 requires "a coating supported by the first substrate, the coating including first and second IR reflecting layers, each of the IR reflecting layers being sandwiched between and contacting a respective pair of contact layers; wherein the coating has a sheet resistance (R_s) no greater than 3.5 ohms/square; and wherein the IG window unit has a visible transmission of at least 70%, a solar heat gain coefficient (SHGC) no greater than 0.45, and outside reflective color characterized by $a^*_{\text{outside reflective}}$ from –3.0 to 2.0 and $b^*_{\text{outside reflective}}$ from –5.0 to 1.0." The cited art fails to disclose or suggest these aspects of claim 17. These requirements of claim 17 are clearly not inherent in the cited art as alleged in the Office Action.

Claim 21 requires a non-heat treated coated article including "a coating supported by a glass substrate, the coating comprising an infrared (IR) reflecting layer sandwiched

between and contacting first and second contact layers; and wherein the first contact layer includes zinc oxide and the second contact layer comprises at least one of nickel oxide, chromium oxide, and nickel-chrome oxide." The cited art fails to disclose or suggest these aspects of claim 21.

Claim 27 requires a coated article that is not thermally tempered or heat bent, and which includes "b) a zinc oxide inclusive contact layer; c) a silver inclusive layer contacting the zinc oxide inclusive layer b); d) a contact layer including at least one of nickel oxide and chrome oxide that is located over and contacts the silver inclusive layer c)." The cited art fails to disclose or suggest these aspects of claim 27.

Claim 35 is a method claim, and requires "sputtering a lower contact layer comprising zinc oxide onto the substrate over the first dielectric layer; sputtering an infrared (IR) reflecting layer over and contacting the lower contact layer; sputtering an upper contact layer comprising at least one of an oxide of nickel, an oxide of chromium, and nickel chrome oxide, in an atmosphere comprising oxygen gas, onto the substrate over and in contact with the IR reflecting layer." The cited art fails to disclose or suggest these aspects of claim 35.

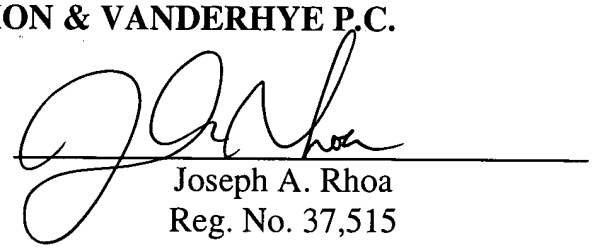
Claim 37 requires "an infrared (IR) reflecting layer comprising silver; an ***upper contact layer comprising at least one of an oxide of nickel, an oxide of chromium, and nickel chrome oxide*** that contacts the IR reflecting layer comprising silver; another dielectric layer comprising ***tin oxide provided over and in contact with the upper contact layer***; and another dielectric layer comprising silicon nitride provided over the another dielectric layer comprising tin oxide." The cited art fails to disclose or suggest this aspect

of claim 37. Both Krisko and Macquart, for example, fail to disclose or suggest a layer comprising tin oxide being located over and in contact with an upper contact layer comprising at least one of an oxide of nickel, an oxide of Cr, and/or an oxide of NiCr. Even if the cited references were combined as alleged in the Office Action (which applicant believes would be incorrect in any event), the invention of claim 37 still would not be met.

For at least the foregoing reasons, it is respectfully requested that all rejections be withdrawn. All claims are in condition for allowance. If any minor matter remains to be resolved, the Examiner is invited to telephone the undersigned with regard to the same.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: 

Joseph A. Rhoa
Reg. No. 37,515

JAR:caj
1100 North Glebe Road, 8th Floor
Arlington, VA 22201-4714
Telephone: (703) 816-4000
Facsimile: (703) 816-4100

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

1. (Amended) A coated article comprising:

a coating or layer system supported by a glass substrate, the coating or layer system comprising from the glass substrate outwardly:

a) a titanium oxide inclusive layer;

b) a zinc oxide inclusive contact layer;

c) a silver inclusive layer contacting the zinc oxide inclusive layer b);

d) a nickel chrome oxide inclusive layer contacting the silver inclusive layer c);

e) a tin oxide inclusive layer;

f) a zinc oxide inclusive layer;

g) a silver inclusive layer;

h) a nickel chrome oxide inclusive layer; and

i) a silicon nitride inclusive layer;

wherein the coated article has a visible transmission of at least about 70% and the coating or layer system has a sheet resistance (R_s) of no greater than 5.0 ohms/square; and

wherein the coated article is not tempered or heat bent.

7. (Amended) A non-heat-treated coated article comprising:

a substrate;

a first dielectric layer supported by the substrate;

a lower contact layer comprising zinc oxide;

an infrared (IR) reflecting layer comprising silver contacting the lower contact layer comprising zinc oxide;

an upper contact layer comprising at least one of an oxide of nickel, an oxide of chromium, and nickel chrome oxide which contacts the IR reflecting layer comprising silver; [and]

wherein the IR reflecting layer comprising silver is located between and in contact with the lower and upper contact layers[.]; and

wherein the coated article is not heat treated.

17. (Unamended) An insulating glass (IG) window unit comprising:

first and second substrates spaced from one another,

a coating supported by the first substrate, the coating including first and second IR reflecting layers, each of the IR reflecting layers being sandwiched between and contacting a respective pair of contact layers;

wherein the coating has a sheet resistance (R_s) no greater than 3.5 ohms/square; and

wherein the IG window unit has a visible transmission of at least 70%, a solar heat gain coefficient (SHGC) no greater than 0.45, and outside reflective color characterized by $a^*_{outside\ reflective}$ from –3.0 to 2.0 and $b^*_{outside\ reflective}$ from –5.0 to 1.0.

21. (Amended) A non-heat-treated coated article comprising:

a coating supported by a glass substrate, the coating comprising an infrared (IR) reflecting layer sandwiched between and contacting first and second contact layers; and

wherein the first contact layer includes zinc oxide and the second contact layer comprises at least one of nickel oxide, chromium oxide, and nickel-chrome oxide.

27. (Amended) A coated article comprising:

a coating or layer system supported by a glass substrate, the coating or layer system comprising from the glass substrate outwardly:

a) a dielectric layer(s);

b) a zinc oxide inclusive contact layer;

c) a silver inclusive layer contacting the zinc oxide inclusive layer b);

d) a contact layer including at least one of nickel oxide and chrome oxide that is located over and contacts the silver inclusive layer c);

e) a dielectric layer(s);

f) a zinc oxide inclusive contact layer;

g) a silver inclusive layer;

h) a contact layer; and

i) a dielectric layer(s);

wherein the coated article has a visible transmission of at least about 70% and the coating or layer system has a sheet resistance (R_s) no greater than 5.0 ohms/square[.]; and

wherein the coated article is not thermally tempered or heat bent.

35. (Amended) A method of making a coated article, the method comprising:

providing a substrate;

sputtering a first dielectric layer onto the substrate;

sputtering a lower contact layer comprising zinc oxide onto the substrate over the first dielectric layer;

sputtering an infrared (IR) reflecting layer over and contacting the lower contact layer;

sputtering an upper contact layer comprising at least one of an oxide of nickel, an oxide of chromium, and nickel chrome oxide, in an atmosphere comprising oxygen gas, onto the substrate over and in contact with the IR reflecting layer; and

sputtering at least one dielectric layer onto the substrate over the upper contact layer.

37. (Amended) A coated article comprising:

a substrate;

a first dielectric layer supported by the substrate;

an infrared (IR) reflecting layer comprising silver;

an upper contact layer comprising at least one of an oxide of nickel, an oxide of chromium, and nickel chrome oxide that contacts the IR reflecting layer comprising silver;

another dielectric layer comprising tin oxide provided over and in contact with the upper contact layer; and

another dielectric layer comprising silicon nitride provided over the another dielectric layer comprising tin oxide.